RETURN TO MAIN MENU

INVERTEC® V350-PRO (CE)

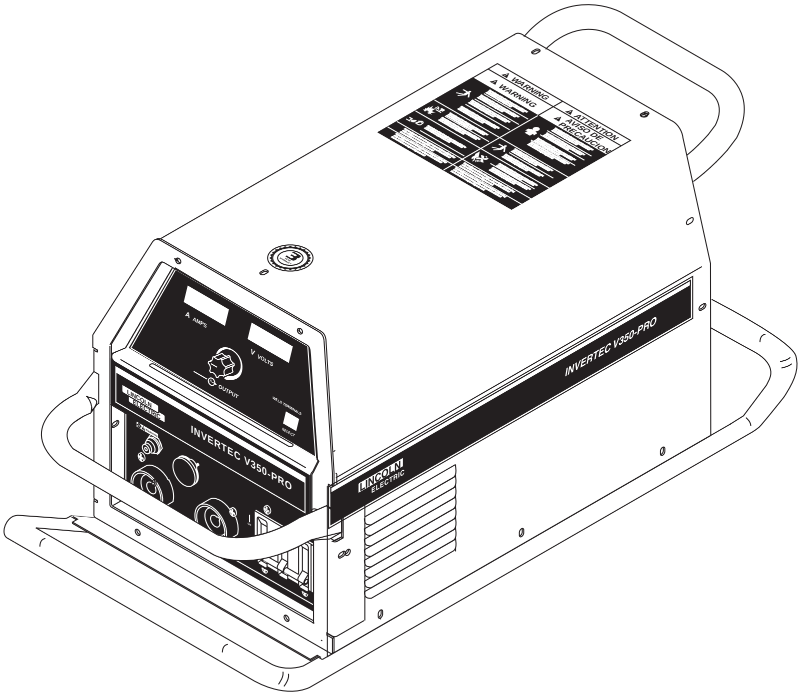
IM732-B

June, 2009

For use with machines Code; 10875, 11483,11562

Safety Depends on You

Lincoln arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.



ISO/IEC 60974-1
IP23S

OPERATOR'S MANUAL

ISO 9001
Designed and Manufactured Under a Quality Program Certified by ABS Quality Evaluations, Inc. to ISO 9001 Requirements.
CERTIFICATE NUMBER: 30273

LINCOLN® ELECTRIC

• World's Leader in Welding and Cutting Products •
• Sales and Service through Subsidiaries and Distributors Worldwide •
Cleveland, Ohio 44117-1199 U.S.A. TEL: 216.481.8100 FAX: 216.486.1751 WEB SITE: www.lincolnelectric.com

WARNING

CALIFORNIA PROPOSITION 65 WARNINGS

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.	The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.
The Above For Diesel Engines	The Above For Gasoline Engines

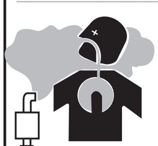
ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of “Safety in Welding & Cutting - ANSI Standard Z49.1” from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of “Arc Welding Safety” booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE powered equipment.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.



1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.



1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

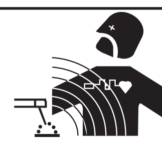


1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.



1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.



ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.

Mar ‘95



ELECTRIC SHOCK can kill.

3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- **Semiautomatic DC Constant Voltage (Wire) Welder.**
- **DC Manual (Stick) Welder.**
- **AC Welder with Reduced Voltage Control.**

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

3.j. Also see Items 6.c. and 8.



ARC RAYS can burn.

4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. I standards.

4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



FUMES AND GASES can be dangerous.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

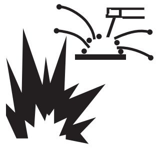
5. b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

5.e. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.f. Also see item 1.b.



WELDING and CUTTING SPARKS can cause fire or explosion.

6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to “Safety in Welding and Cutting” (ANSI Standard Z49.1) and the operating information for the equipment being used.

6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances”, AWS F4.1 from the American Welding Society (see address above).

6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

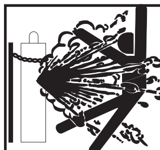
6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h. Also see item 1.c.

6.I. Read and follow NFPA 51B “ Standard for Fire Prevention During Welding, Cutting and Other Hot Work”, available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, Ma 022690-9101.

6.j. Do not use a welding power source for pipe thawing.



CYLINDER may explode if damaged.

7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

7.c. Cylinders should be located:
- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, “Precautions for Safe Handling of Compressed Gases in Cylinders,” available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.



FOR ELECTRICALLY powered equipment.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer’s recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer’s recommendations.

Refer to **http://www.lincolnelectric.com/safety** for additional safety information.

PRÉCAUTIONS DE SÛRETÉ

Pour votre propre protection lire et observer toutes les instructions et les précautions de sûreté specifiques qui parraissent dans ce manuel aussi bien que les précautions de sûreté générales suivantes:

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:

   a. Les circuits à l'électrode et à la piéce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vétements mouillés. Porter des gants secs et sans trous pour isoler les mains.
   b. Faire trés attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher metallique ou des grilles metalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
   c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état defonctionnement.
   d.Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
   e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
   f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces precautions pour le porte-électrode s'applicuent aussi au pistolet de soudage.

2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas ou on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.

3. Un coup d'arc peut être plus sévère qu'un coup de soliel, donc:

   a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
   b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
   c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.

4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.

5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans lateraux dans les zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.

7. Quand on ne soude pas, poser la pince à une endroit isolé de la masse. Un court-circuit accidental peut provoquer un échauffement et un risque d'incendie.

8. S'assurer que la masse est connectée le plus prés possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'echauffement des chaines et des câbles jusqu'à ce qu'ils se rompent.

9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particuliérement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumeés toxiques.

10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgéne (gas fortement toxique) ou autres produits irritants.

11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

PRÉCAUTIONS DE SÛRETÉ POUR LES MACHINES À SOUDER À TRANSFORMATEUR ET À REDRESSEUR

1. Relier à la terre le chassis du poste conformement au code de l'électricité et aux recommendations du fabricant. Le dispositif de montage ou la piece à souder doit être branché à une bonne mise à la terre.

2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.

3. Avant de faires des travaux à l'interieur de poste, la debrancher à l'interrupteur à la boite de fusibles.

4. Garder tous les couvercles et dispositifs de sûreté à leur place.

Electromagnetic Compatibility (EMC)

Conformance
Products displaying the CE mark are in conformity with European Community Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC). It was manufactured in conformity with a national standard that implements a harmonized standard: **EN 60974-10** Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with other Lincoln Electric equipment. It is designed for industrial and professional use.

Introduction
All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

Installation and Use
The user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve construction of an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note: The welding circuit may or may not be earthed for safety reasons according to national codes. Changing the earthing arrangements should only be authorized by a person who is competent to access whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

Assessment of Area
Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

a) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;

b) radio and television transmitters and receivers;

c) computer and other control equipment;

d) safety critical equipment, e.g., guarding of industrial equipment;

e) the health of the people around, e.g., the use of pacemakers and hearing aids;

f) equipment used for calibration or measurement

g) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;

h) the time of day that welding or other activities are to be carried out.

L10093 3-1-96H

Electromagnetic Compatibility (EMC)

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

Methods of Reducing Emissions

Mains Supply
Welding equipment should be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment, in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the welding power source so that good electrical contact is maintained between the conduit and the welding power source enclosure.

Maintenance of the Welding Equipment
The welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturers instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturer's recommendations.

Welding Cables
The welding cables should be kept as short as possible and should be positioned close together, running at or close to floor level.

Equipotential Bonding
Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

Earthing of the Workpiece
Where the workpiece is not bonded to earth for electrical safety, not connected to earth because of its size and position, e.g., ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

Screening and Shielding
Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.
1

---

1 Portions of the preceding text are contained in EN 60974-10: "Electromagnetic Compatibility (EMC) product standard for arc welding equipment."

L10093 3-1-96H

Thank You — for selecting a **QUALITY** product by Lincoln Electric. We want you to take pride in operating this Lincoln Electric Company product ••• as much pride as we have in bringing this product to you!

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

Please Examine Carton and Equipment For Damage Immediately

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, Claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Product ____________________

Model Number ____________________

Code Number or Date Code____________________

Serial Number____________________

Date Purchased____________________

Where Purchased____________________

Whenever you request replacement parts or information on this equipment, always supply the information you have recorded above. The code number is especially important when identifying the correct replacement parts.

On-Line Product Registration

- Register your machine with Lincoln Electric either via fax or over the Internet.
  - For faxing: Complete the form on the back of the warranty statement included in the literature packet accompanying this machine and fax the form per the instructions printed on it.
  - For On-Line Registration: Go to our **WEB SITE at www.lincolnelectric.com.** Choose "Quick Links" and then "Product Registration". Please complete the form and submit your registration.

Read this Operators Manual completely before attempting to use this equipment. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection. The level of seriousness to be applied to each is explained below:

⚠ WARNING

This statement appears where the information **must** be followed **exactly** to avoid **serious personal injury** or **loss of life**.

⚠ CAUTION

This statement appears where the information **must** be followed to avoid **minor personal injury** or **damage to this equipment**.

TABLE OF CONTENTS

Page

TECHNICAL SPECIFICATIONS - INVERTEC® V350-PRO (CE)

INPUT AT RATED OUTPUT

Product Name	Ordering Information	Input AC Voltage 50/60 Hz	Rated DC Output Amps/Volts/Duty Cycle (continuous)	Output Range	Open Circuit
Invertec® V350-PRO 60/50 Hz	K1728-8 "CE"	200-220/ 380-400/ 415-440/	350A / 34V / 60% 3 Phase 320A / 33V / 60% 1 Phase	AMPS 5-425	80 VD
			275A / 31V /100% 1 Phase 300A / 32V / 100% 3 Phase		

RECOMMENDED INPUT WIRE AND FUSE SIZES FOR MAXIMUM RATED OUTPUT

Recommended Fuse Sizes Base On The U.S. National Electrical Code And Maximum Machine Outputs

Input 50/60 Hz Voltage	Phases	Input Amps 300Amps @ 32Volts(100%)	Input Amps 350Amps @ 34Volts(60%)	Recommended Line Cord AWG	Recommended Maximum Fuse size	Notes
200	3	41	48	6	80A	Note 2
220	3	37	48	6	80A	Note 2
380	3	28	28	8	50A	
400	3	22	27	8	50A	
415	3	22	26	8	50A	
440	3	21	24	8	50A	

Voltage	Phases	Input Amps 275 Amps @ 31Volts(100%)	Input Amps 320 Amps @ 33Volts(60%)	Recommended Line Cord AWG	Recommended Maximum Fuse size	Notes
200	1	Not Recommended	Not Recommended	---	---	Note 1
220	1	64	82	4	125A	Note 2
380	1	44	55	6	80A	Note 2
400	1	40	50	8	80A	
415	1	38	48	8	80A	
440	1	35	45	8	80A	

Note 1. Not rated is indicated by 4-x's in the box on the rating plate.
Note 2. When operating on these inputs, the line cord should be changed to an input conductor of 6 AWG or larger.

OUTPUT CABLES, CONNECTIONS AND LIMITATIONS

Select the output cable size based upon the following chart.
Cable sizes for Combined Length of Electrode and Work Cable (Copper) 75C rated:

DUTY CYCLE	CURRENT	LENGTH UP 61m (200 FT)	61-76m (200-250 FT)
100%	275	1/0	1/0
60%	350	1/0	2/0

PHYSICAL DIMENSIONS

Height	Width	Depth	Weight with Cord
14.8"(373mm)	12.5"(317mm)	27.8" *(706mm*)	86.5 Lbs.(37.4 Kg)

TEMPERATURE RANGES

OPERATING TEMPERATURE RANGE	STORAGE TEMPERATURE RANGE
-20°C to +40°C	-40°C to +40°C

* Overall Length Including Handle, 27.8" (706mm)

SAFETY PRECAUTIONS

WARNING

ELECTRIC SHOCK can kill.

• TURN THE INPUT POWER OFF AT THE DISCONNECT SWITCH BEFORE ATTEMPTING TO CONNECT OR DISCONNECT INPUT POWER LINES, OUTPUT CABLES, OR CONTROL CABLES.

- **Only qualified personnel should perform this installation.**
- **Connect the green/yellow lead of the power cord to ground per appropriate National Electrical Code.**

SELECT SUITABLE LOCATION

The Invertec® V350-PRO (CE) will operate in harsh environments. Even so, it is important that simple preventative measures are followed in order to assure long life and reliable operation.

- The machine must be located where there is free circulation of clean air such that air movement in the back, out the sides and bottom will not be restricted.
- Dirt and dust that can be drawn into the machine should be kept to a minimum. Failure to observe these precautions can result in excessive operating temperatures and nuisance shutdown.
- Keep machine dry. Shelter from rain and snow. Do not place on wet ground or in puddles.

CAUTION

- **DO NOT MOUNT OVER COMBUSTIBLE SURFACES. Where there is a combustible surface directly under stationary or fixed electrical equipment, that surface shall be covered with a steel plate at least .06"(1.6mm) thick, which shall extend not less than 5.90"(150mm) beyond the equipment on all sides.**

STACKING

Invertec® V350-PRO (CE) <u>cannot</u> be stacked.

TILTING

Place the machine directly on a secure, level surface or on a recommended undercarriage. The machine may topple over if this procedure is not followed.

INPUT AND GROUNDING CONNECTIONS

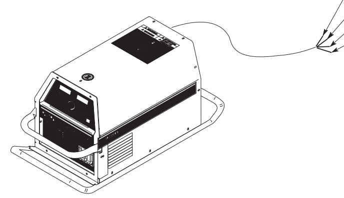
- Only a qualified electrician should connect the Invertec® V350-PRO (CE). Installation should be made in accordance with the appropriate National Electrical Code, all local codes and the information detailed below.
- When received directly from the factory, multiple voltage machines are internally connected for 440VAC. If 440VAC is the desired input, then the machine may be connected to the power system without any setup required inside the machine.
- Initial 200VAC - 415VAC operation will require an Input voltage panel setup.
  - Open the access panel on the rear of the machine.
  - For 200 or 230: Position the large switch to 200-230. For higher voltages: Position the large switch to ≥ 380.
  - Move the "A" lead to the appropriate terminal.

POWER CORD CONNECTION

A 5 meter power cord is wired into the machine. Follow the power cord connection instructions.

CAUTION

- **Incorrect connection may result in equipment damage.**



Single Phase Input

Connect green/yellow lead to ground per National Electrical Code.
Connect blue and brown leads to power.
Wrap black lead with tape to provide 600V insulation.

Three Phase Input

Connect green/yellow lead to ground per appropriate National Electric Code.
Connect blue, black and brown leads to power.

CONNECTIONS OF WIRE FEEDERS TO INVERTEC® V350-PRO (CE)

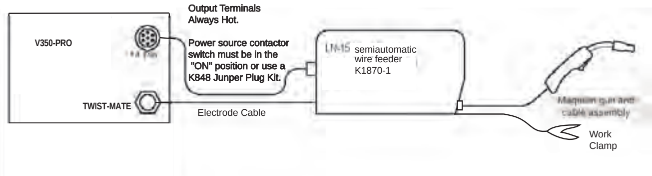
LN-10 Connection Instructions

- Turn the Invertec® power switch "off".
- Connect the K1505 control cable from the LN-10 to the 14-pin MS-style connector.
- Connect the electrode cable to the output terminal of polarity required by the electrode. Connect the work lead to the other terminal.
- Set the meter polarity switch on the front of the Invertec® to coincide with wire feeder polarity used.
- See the LN-10 manual for details on accessing Control DIP Switch

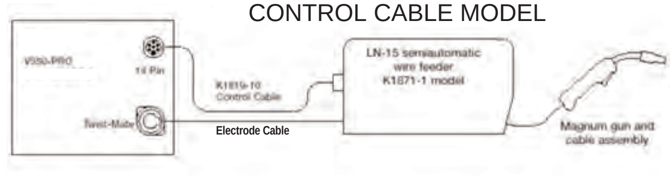
LN-15 Connection Instructions

- Turn the Invertec® power switch "off".
- Connect the electrode cable to the output terminal of polarity required by electrode. (See Figures below)

ACROSS THE ARC MODEL



CONTROL CABLE MODEL



- Set the meter polarity switch on the front of the Invertec® to coincide with wire feeder polarity used.

LN-25 Connection Instructions

- Turn the Invertec® power switch "off".
- Connect the electrode cable to the output terminal of polarity required by electrode. Connect the work lead to the other terminal.
- LN-25 with Remote Control options can be used with the "CE" version of the V350. The 6-Pin (K444-1) and 14-pin (K444-2) remotes can be connected directly to the 6-pin & 14-pin MS-style connector. The 42 Volt Remote Voltage and Output Control (K624-1) Kit can be connected to the V350's 14-pin MS-style connector using Remote Control Cable assembly K627- [ ]. LN-25s with a K431-1 remote kit can be connected to the V350's 14-pin MS-style connector using a K432 cable and K876 adapter. (See connection diagram S19899). Or the K432 cable could be modified with a K867 Universal Adapter Plug (See connection diagram S19405) to connect it to the V350's 14-pin MS-style connector.

LN-742 Connection Instructions

- Turn the Invertec® power switch "off"
- Either a K591 or a K593 Input cable assembly is required to connect the LN-742 to the Invertec®.
- Connect the control cable from the LN-742 to the 14-pin MS-style connector.
- Connect the electrode cable to the output terminal of the polarity required by electrode. Connect the work lead to the other terminal.
- Set the meter polarity switch on the front of the Invertec® to coincide with wire feeder polarity used. The wire feeder will now display the welding voltage.
- If a remote control such as K857 is to be used with the LN-742, the remote can be connected directly to the 6-pin MS-style connector on the front of the Invertec® or use a K864 adapter to connect the LN-742 and the remote to the 14-pin MS-style connector.

Cobramatic Connection Instructions

- Turn the Invertec® power switch "off"
- Connect the control cable from the Cobramatic to the 14-pin MS-style connector.
- Connect the electrode cable to the output terminal of the polarity required by electrode. Connect the work lead to the other terminal.
- Set the meter polarity switch on the front of the Invertec® to coincide with wire feeder polarity used.
- If a remote control such as K857 is to be used with the Cobramatic, the remote can be connected directly to the 6-pin MS-style connector on the front of the Invertec® or use a K864 adapter to connect the cobramatic and the remote to the 14-pin MS-style connector.

CONNECTION OF WIRE FEEDERS TO V350-PRO (CE)

Wire feeders other than these listed may be used provided that the auxiliary power supply capacity of the Invertec® is not exceeded. K867 Universal Adapter Plug may be required. See connection diagram S24985 on page F-4.

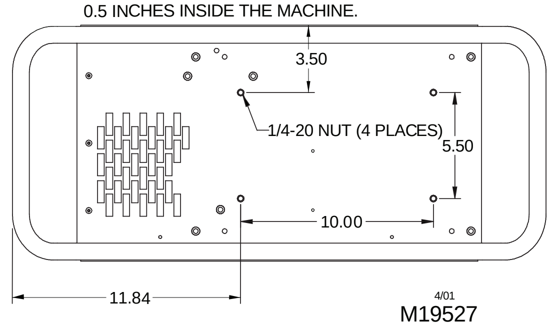
REMOTE CONTROL OF INVERTEC®

Remote Control K857, Hand Amptrol K963 and Foot Amptrol K870.

UNDERCARRIAGE MOUNTINGS

MOUNTING HOLE LOCATIONS

NOTE: MOUNTING SCREWS CAN NOT PROTRUDE MORE THAN 0.5 INCHES INSIDE THE MACHINE.



PARALLEL OPERATION

The INVERTEC® v350-pro (CE) are operable in parallel in CC mode. For best results, the currents of each machine should be reasonably well shared. As an example, with two machines set up in parallel for a 400 amp procedure, each machine should be set to deliver approximately 200 amps, not 300 amps from one and 100 amps from the other. This will minimize nuisance shutdown conditions. In general, more than two machines in parallel will not be effective due to the voltage requirements of procedures in that power range.

To set machine outputs, start with output control pots and arc control pots in identical positions. Use the output control pots to balance the currents and maintain the desired current. The arc control pots should be kept identical on the two machines.

SAFETY PRECAUTIONS

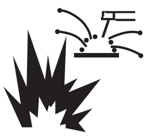
⚠ WARNING



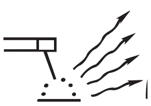
ELECTRIC SHOCK can kill.
- **Do not touch electrically live parts or electrode with skin or wet clothing.**
- **Insulate yourself from work and ground.**
- **Always wear dry insulating gloves.**



FUMES AND GASES can be dangerous.
- **Keep your head out of fumes.**
- **Use ventilation or exhaust to remove fumes from breathing zone.**



WELDING SPARKS can cause fire or explosion.
- **Keep flammable material away.**
- **Do not weld on closed containers.**



ARC RAYS can burn eyes and skin.
- **Wear eye, ear and body protection.**

See additional warning information at front of this operator's manual.

GENERAL DESCRIPTION

PRODUCT DESCRIPTION & DUTY CYCLE

The Invertec® V350-PRO (CE) offers multi mode CV and CC DC welding and is rated at 350 amps, 34 volts at a 60% duty cycle with 3 phase input. It is also rated at 320 amps with single phase input. It is rated at 275 amps, 100% duty cycle.

OPERATIONAL FEATURES and CONTROLS:

UPPER CONTROL PANEL

1. AMPS Meter
- Prior to STICK or TIG operation (current flow), the meter displays preset current value (either 2 amps or +/- 3% (e.g. 3 amps on 100), whichever is greater).
- Prior to CV operation, the meter displays four dashes indicating non-presettable AMPS.
- During welding, this meter displays actual average amps.
- After welding, the meter holds the actual current value for 5 seconds. Output adjustment while in the "hold" period results in the "prior to operation" characteristics stated above. The displays blink indicating that the machine is in the "Hold" period.

2. VOLT METER
- Prior to CV operation (current flow), the meter displays desired preset voltage value (+/- .5V).
- Prior to STICK or TIG operation, the meter displays the Open Circuit Voltage of the Power Source or four dashes if the output has not been turned on.
- During welding, this meter displays actual average volts.
- After welding, the meter holds the actual voltage value for 5 seconds. The displays blink indicating that the machine is in the "Hold" period.
- Output adjustment while in the "hold" period results in the "prior to operation" characteristics stated above.

3. OUTPUT CONTROL
- Output control is conducted via a single turn potentiometer.
- Adjustment is indicated by the meters as stated above.
- When in TIG modes, this control sets the maximum welding current. Full depression of a foot or hand Amptrol results in the preset level of current.

4. WELD TERMINALS-REMOTE , ON
- Two status lights indicate the location of trigger control as determined by the "WELD TERMINALS" push button.
- If trigger control is local "weld terminals on", the ON display will be lit.
- If trigger control is remote "weld terminals remotely controlled", the REMOTE display will be lit.
- The unit will power up in "pre-determined preferred" trigger modes.

STICK = ON
TIG and CV = ON or REMOTE depending if remote output controls are connected to the machine.

5. THERMAL

- This status light indicates when the power source has been driven into thermal overload. If the output terminals were "ON", the "ON" light will blink indicating that the output will be turned back on once the unit cools down to an acceptable temperature level. If the unit was operating in the "REMOTE" mode, the trigger will need to be opened before or after the thermal has cleared and closed after the machine has cooled down to an acceptable temperature to establish output.

6. CONTROL-REMOTE , LOCAL

- Two status lights indicate the location of output control as pre-determined by the power sources auto-configure system.
- The LOCAL display will be lit when control is at the power source.
- The REMOTE display will be lit when a remote pot/control is detected.

These Output Control configurations can be overridden (switched) with the CONTROL push button. When changed, the unit will power up in the configuration it was in when it was last powered down.

Hidden Middle Control Panel – Process Set Up Panel

The middle control panel is removable to allow for upgrades (see Field Installed Options/Accessories). Additionally, this panel is hidden by an access door to reduce appeared complexity and provide protection to the controls.

7. WELD MODE SELECT

The Mode Control button selects the following welding modes desired.

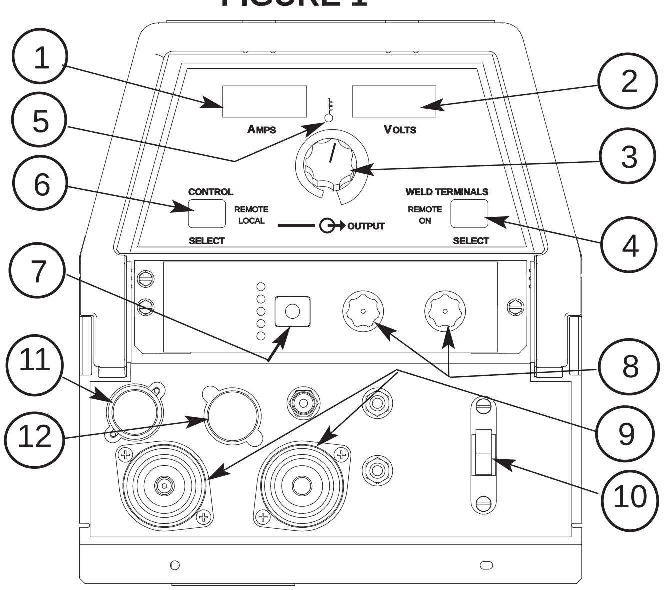
CC-STICK SOFT: The Stick Soft process features continuous control ranging from 5 to 425 amps. This mode was intended for most SMAW applications, and Arc Gouging.

- Arc Gouging: Setting the output of the Stick Soft mode to 425 amps will enable the arc-gouging mode. The actual output current will depend on the size of carbon used. The recommended maximum size carbon is 5/16".
- The Hot Start control regulates the starting current at arc initiation. Hot Start can be adjusted from minimum (0), with no additional current added at arc start, to maximum (10), with double the preset current or 425 amps (max of machine) added for the first second after arc initiation.
- The Arc Control regulates the Arc Force to adjust the short circuit current. The minimum setting (-10) will produce a "soft" arc and will produce minimal spatter. The maximum setting (+10) will produce a "crisp" arc and will minimize electrode sticking.

CC-STICK CRISP: The Stick Crisp mode features continuous control from 5 to 425 amps. This mode was intended primarily for pipe welding applications.

- The Hot Start control regulates the starting current at arc initiation. Hot Start can adjust starting current up or down by 25% of the preset value. The recommended setting for Hot Start is 5 where the initial current is equal to the preset current.

FIGURE 1



- The Arc Control regulates the Arc Force to adjust the short circuit current. The minimum setting (-10) will produce a "soft" arc and will produce minimal spatter. The maximum setting (+10) will produce a "crisp" arc and will minimize electrode sticking.

TIG GTAW: The TIG mode features continuous control from 5 to 425 amps. The TIG mode can be run in either the TIG touch start or high frequency assisted start mode.

- The Hot Start control selects the starting mode desired. A setting of less than 5, the TIG lift start mode is selected. The OCV is controlled below 10v and the short circuit "TIG touch" current is maintained at 25 amps independent of the preset current. When the tungsten is lifted, an arc is initiated and the output is regulated at the preset value. Hot start settings between 0 and 5 regulate the arc initiation current. A setting of 5 results in the most positive arc initiation. A setting of 0 reduces hot start.
- Hot Start settings between 5 and 10, select high frequency assisted starting TIG mode. In this range, the OCV of the machine is controlled between 50 and 70 volts. If using the Lincoln K930-1 TIG Module, set the Hot start to 10 for maximum OCV.
- The Arc Control is not used in the TIG mode.

TIG SOLENOID OPTION

The Solenoid only operates when th V350 is in the TIG mode. If the Weld Terminals are in “Remote” then the solenoid will open when the arc start switch is closed. The solenoid will close after the arc switch has been opened and the post flow time expired.

If the Weld Terminals are turned “ON”, then the solenoid will open when the electrode is touch to the work. The electrode needs to remain in contact with the work to allow for gas coverage before attempting to start the arc. The solenoid will close after the arc has been broken and the post flow time expired.

CV-WIRE: The CV-WIRE mode features continuous control from 10 to 45 volts. The mode was intended for most GMAW, FCAW, and MCAW applications.

- The Hot Start control is not used in the CV-WIRE mode.
- The Arc Control regulates pinch effect. At the minimum setting (-10), minimizes pinch and results in a soft arc. Low pinch settings are preferable for welding with gas mixes containing mostly inert gases. At the maximum setting (+10), maximizes pinch effect and results in a crisp arc. High pinch settings are preferable for welding FCAW and GMAW with CO_2.

CV-INNERSHIELD: The CV-INNERSHIELD mode features continuous control from 10 to 45 volts. This mode was designed for self-shielded flux cored wires that require tight voltage control.

- The Hot Start control is not used in the CV-FLUX CORED mode.
- The Arc Control regulates pinch effect. At the minimum setting (-10), minimizes pinch and results in a soft arc. At the maximum setting (+10), maximizes pinch effect and results in a crisp arc. Most self-shielded wires work well at an Arc Control setting of 5.

8. HOT START and **ARC CONTROL** features have different functions depending on the welding Mode that is active. Each feature is described under the welding mode heading. **(See Item 6 for specified Mode Operation)**

LOWER CASE FRONT

The output studs, line switch and remote connector are located on the lower case front.

9. Both STUDS contain "Twist-Mate" connector inserts.
- The Negative stud is configured to accept the pass through gas system.

10. The ON-OFF switch is a 3-phase circuit breaker rated at 100 amps per leg.

11. The METER POLARITY switch is located above the output connectors. The switch provides a work connection for wire feeder voltmeters. Place the switch in the position of the electrode polarity indicated by the decal. **The switch does not change the welding polarity.**

12. 6-PIN MS-style connector for remote control.

REMOTE CONTROL of the OUTPUT CONTROL and WELD TERMINALS

The Invertec® V350-PRO (CE) has auto sensing of remote output controls.If after connecting or removing a remote, the Invertec® V350-PRO (CE) did not configured the way you would like the local or remote control settings can be changed by pushing the OUTPUT CONTROL or WELD TERMINAL button. (A user cannot select between the 6 and 14-pin MS-style connector.)

CV modes
- The remote will default to the 14-pin MS-style connector remote if a remote is connected. If no remote is connected to the 14-pin MS-style connector then the remote will default to the 6-pin MS-style connector if a remote is connected to it.
- In all of the CV modes, the WELD TERMINAL control will default to REMOTE.

TIG mode

- The remote will default to the 6-pin MS-style if a remote control is connected to the 6-pin MS-style and to the 14-pin MS-style connectors. If a remote is not connected to the 6-pin MS-style connector then the remote will default to the 14-pin MS-style connector if a remote is connected.
- If a remote control is connected to any of the amphenols the WELD TERMINAL control will default to REMOTE. If there are not any remote control devices attached the WELD TERMINAL control will default to ON.

CC-Stick modes

- The remote will default to only the 6-pin amphenol if a remote is connected to it.
- The WELD TERMINAL control will default to ON with or without a remote connected.

Types of Remote OUTPUT CONTROL

- The Invertec® V350-PRO (CE)'s Output Control can be controlled by either a potentiometer connected between 77 & 75 with the wiper connected to 76 or a 0V to 10V DC supply connected between 76 & 75. (76 needs to be positive)
- 14-pin MS-style connector lead 75 is pin G, lead 76 is pin F and lead 77 is pin E.
- 6-pin MS-style connector lead 75 is pin C, lead 76 is pin B and lead 77 is pin A.

Potentiometer Control

- The total resistance should be between 2000 ohms (2K) and 10,000 ohms (10K)
- The machine output will be at minimum when lead 76 (wiper) is at the end of the potentiometer that is connected to 75. The machine's output will increase as the wiper of the potentiometer is moved to the end that is connected to 77. (Note: In TIG mode, moving the lead 76 (wiper) to lead 77 would produce the current that has been set by the Invertec® V350-PRO (CE)'s front panel Output Control.)
- Remotes of this type offered by Lincoln Electric are the K857, K812 and K870.

Voltage Control

- The supply should be an isolated supply. (Not referenced to earth ground, any auxiliary power from the Invertec® V350-PRO (CE) or the welding output) The supply should be capable of supplying at least 20mA.
- 0 volts supplied to 76 will set the Invertec® V350-PRO (CE) to minimum output for the mode that has been selected while 10 volts supplied to 76 will set the Invertec® V350-PRO (CE) to the maximum output for the mode. (Note: In TIG mode, 10 volts supplied to lead 76 would produce the current that has been set by the Invertec® V350-PRO (CE)'s front panel Output Control.)

Types of Remote WELD TERMINAL Control

- The Invertec® V350-PRO (CE)'s Weld Terminals can be controlled from each of the amphenol connectors. The circuit has a nominal OCV of 15VDC and requires a dry contact closure (less than 100 ohms) to activate the output of the Invertec® V350-PRO (CE).
- 14 Pin Amphenols the Weld Terminals are controlled from pins C (lead 2) and pin D (lead 4). Pin C is positive.
- 6 Pin Amphenol the Weld Terminals are controlled from pin D (lead 2) and pin E (lead 4). In the 6-pin amphenol pin D is positive.

AUXILIARY POWER

- 42VAC and 24VAC power is available from the 14-pin MS-style connector. These supplies are intended to supply power for auxiliary equipment like wire feeders.
- 42 VAC supply is rated at 5.5 amps and is protected by a 10 amp breaker located by the amphenol.
- 24 VAC supply is rated at 5.5 amps and is protected by a 10 amp breaker located by the amphenol.

LIMITATIONS

- The V350-PRO (CE) is not recommended for processes other than those listed.
- The V350-PRO (CE) can only be used with the recommended equipment and options.

RECOMMENDED PROCESSES

Properly equipped, the Invertec® V350-PRO (CE) supports GMAW, FCAW, SMAW, GTAW and CAC-A processes for a variety of materials, including mild steel, stainless steel, cored wires, and aluminum

OPTIONS / ACCESSORIES

- The V350-PRO (CE) provides the hardware to power and connect to 24 or 42 wire feeders.

K857	Remote Output Control
K814	Arc Start Switch
K812	Hand Operated Amptrol
K870	Foot Operated Amptrol
K428, K446, K449	LN-25
K617 (-1 or -2) K618 (-1 or -2)	LN-742
K1559-1, K1564-1	LN-10
K1499-1, K1521-1	DH-10
K1587-1	Cobramatic

Welding Cable Connectors:
- K852-70 1/0-2/0 cable
- K852-95 2/0-3/0 cable

FIELD INSTALLED OPTIONS

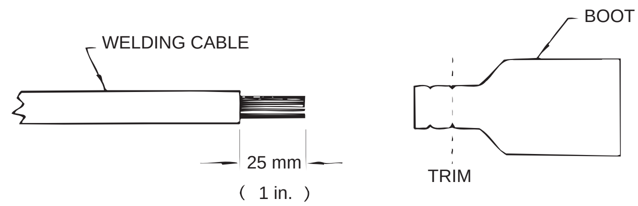
- K1762-2 TIG Gas Control Kit
- K1764-1 Undercarriage
- K1838-1 Valet Style Undercarriage

QUICK DISCONNECT PLUGS

A quick disconnect system is used for the welding cable connections. The The K852-70 is designed to accept a welding cable size of 1/0 to 2/0.

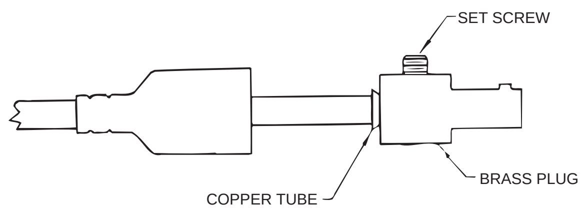
1. Remove 25mm (1 in.) of welding cable insulation.

2. Slide rubber boot onto cable end. The boot end may be trimmed to match the cable diameter. Soap or other lubricant will help to slide the boot over the cable.



3. Slide the copper tube into the brass plug.

4. Insert cable into copper tube.



5. Tighten set screw to collapse copper tube. Screw must apply pressure against welding cable. The top of the set screw will be well below the surface of the brass plug after tightening.

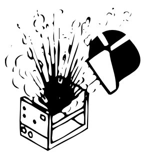
6. Slide rubber boot over brass plug. The rubber boot must be positioned to completely cover all electrical surfaces after the plug is locked into the receptacle.

SAFETY PRECAUTIONS

⚠ WARNING



ELECTRIC SHOCK can kill.
- **Do not touch electrically live parts or electrode with skin or wet clothing.**
- **Insulate yourself from work and ground**
- **Always wear dry insulating gloves.**



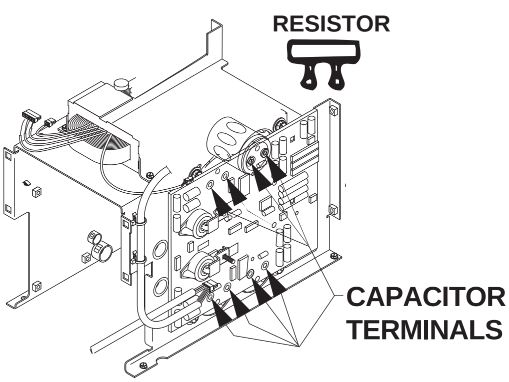
EXPLODING PARTS can cause injury.
- **Failed parts can explode or cause other parts to explode when power is applied.**
- **Always wear a face shield and long sleeves when servicing.**

See additional warning information throughout this operator's manual and the Engine manual as well.

CAPACITOR DISCHARGE PROCEDURE

1. Obtain a power resistor (25 ohms, 25 watts).

2. Hold resistor body with electrically insulated glove. <u>DO NOT TOUCH TERMINALS.</u> Connect the resistor terminals across the two studs in the position shown. Hold in each position for 1 second. Repeat for all four capacitors.



3. Use a DC voltmeter to check that voltage is not present across the terminals on all four capacitors.

VISUAL INSPECTION

Clean interior of machine with a low pressure air stream. Make a thorough inspection of all components. Look for signs of overheating, broken leads or other obvious problems. Many problems can be uncovered with a good visual inspection.

ROUTINE MAINTENANCE

1. Every 6 months or so the machine should be cleaned with a low pressure airstream. Keeping the machine clean will result in cooler operation and higher reliability. Be sure to clean these areas:

   - All printed circuit boards
   - Power switch
   - Main transformer
   - Input rectifier
   - Auxiliary Transformer
   - Reconnect Switch Area
   - Fan (Blow air through the rear louvers)

2. Examine the sheet metal case for dents or breakage. Repair the case as required. Keep the case in good condition to insure that high voltage parts are protected and correct spacings are maintained. All external sheet metal screws must be in place to insure case strength and electrical ground continuity.

PERIODIC MAINTENANCE

Overload Protection
The machine is electrically protected from producing high output currents. Should the output current exceed 430A, an electronic protection circuit will reduce the current to approximately 100A. The machine will continue to produce this low current until the protection circuit is reset. Reset occurs when the output load is removed.

Thermal Protection
Thermostats protect the machine from excessive operating temperatures. Excessive temperatures may be caused by a lack of cooling air or operating the machine beyond the duty cycle and output rating. If excessive operating temperature should occur, the thermostat will prevent output voltage or current. The meter will remain energized during this time.

Thermostats are self-resetting once the machine cools sufficiently. If the thermostat shutdown was caused by excessive output or duty cycle and the fan is operating normally, the Power Switch may be left on and the reset should occur within a 15 minute period.

HOW TO USE TROUBLESHOOTING GUIDE

WARNING

Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

Step 1. LOCATE PROBLEM (SYMPTOM).
Look under the column labeled “PROBLEM (SYMPTOMS)”. This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. POSSIBLE CAUSE.
The second column labeled “POSSIBLE CAUSE” lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION
This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
Major physical or electrical damage is evident when the sheet metal covers are removed.	1. Contact your local authorized Lincoln Electric Field Service facility for technical assistance.	If all recommended possible areas of misadjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility.**
Input fuses keep blowing, or input breaker keeps tripping	1. Make certain that the fuses or breakers are properly sized. See installation section of the manual for recommended fuse and breaker sizes. 2. Welding procedure is drawing too much output current, or duty cycle is too high. Reduce output current, duty cycle or both. 3. There is internal damage to the power source. Contact an authorized Lincoln Electric Service facility.	
Machine will not power up (No lights)	1. Make certain that the power switch is in the "ON" position. 2. The circuit breaker in the reconnect area may have opened. Reset. Check input voltage section below. 3. Input voltage selection made improperly. Power down, check input voltage reconnect according to diagram on reconnect cover. 4. The 6 amp breaker may have opened. Check for overload on 42VAC or 24VAC supply from the 14 pin MS-style connector.	
Machine won't weld, can't get any output.	1. If the displays show an Err ### see the fault section for corrective action. 2. If the displays are not lit refer to machine will not power up section. 3. If the thermal symbol is lit refer to the thermal section. 4. If the output terminals are in Remote control switch to "ON" and check for output voltage. If output voltage is now present check for correct remote control connection and operation.	

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
Thermal symbol is lit	1. Check for proper fan operation. If fan is not operating correctly the CB 2 breaker may have opened. Check for an overload on the 115VAC. Blow air in rear louvers to remove dirt from around fan. 2. Check for material blocking intake or exhaust louvers. 3. Blow air in the rear louvers to clear dirt from the fan.	If all recommended possible areas of misadjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility.**
Wire feeder won't work. Apparently no power to wire feeder	1. Check circuit breakers by the wire feeder receptacles on the rear of the machine. Reset 2. Check the control cable between the power source and the wire feeder for continuity.	

CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual

Fault Codes			
Code	Description		Corrective Action
31	Primary over current.	If condition persists contact an authorized Lincoln Field Service Shop	The machine needs to be turned off and back on to reset the machine.
32	CAP bank A under voltage.	Check input power reconnect to make sure the machine is connected for the input power being supplied.	Self-clearing as condition ceases.
33	CAP bank B under voltage.		
34	CAP bank A over voltage.		
35	CAP bank B over voltage.		
37	Soft start Failed.		Cycle power.
39	Glitch on the primary over current fault interrupt; possibly caused by noise or a signal level (misc. hardware fault #1)	Check the machine ground. If problem persists contact an authorized Lincoln Field Service Shop	Self-clearing as condition ceases.
43	CAP delta; CAP A and B are out of balance.	Check input power reconnect to make sure the machine is connected for the input power being supplied.	
44	Main CPU problem. The DSP has detected a problem with the CPU.	Check the machine ground.	
47	Glitch on the CAP/heart beat interrupt; possibly caused by noise or a signal level right at the trip threshold. (misc. hardware fault #2)	If problem persists contact an authorized Lincoln Field Service Shop	
48	The main contactor opened unexpectedly. (misc. hardware fault #3)	If condition persist contact an authorized Lincoln Field Service Shop	Self-clearing
"bad node' “####”	The selected weld mode does not exist in the weld table that is presently loaded in the machine.	If condition persists contact an authorized Lincoln Field Service Shop	Press the Mode Select button to select a different mode

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual

Displays	Description
Scrolling dash	Appears at power up while the machine is going through its self configuration
"Err" "####"	Fault code display. The first fault to occur will be displayed for three seconds. The display will cycle through fault codes for all faults that persist after the initial three-second period are displayed for 1 second each.
"----" "----"	Weld mode is changing
"----" "####"	A constant voltage weld mode is selected, machine output is off. The numeric value in the right display is the work point.
"####" "----"	A constant current weld mode is selected, machine output is off. The numeric value in the left display is either the work point or a work point limit, depending on the weld mode and remote configuration.
"####" "####"(on steady)	machine output is on. Left display is current, right display is voltage. If actively welding, the displays are arc current and arc voltage. If not actively welding, the display will show work point.
"####" "####" (blinking)	weld just finished – the average arc voltage and current will be blinked for 5 seconds following a weld. If the work point changes during this 5 second period, the display will revert to the above mode.

CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

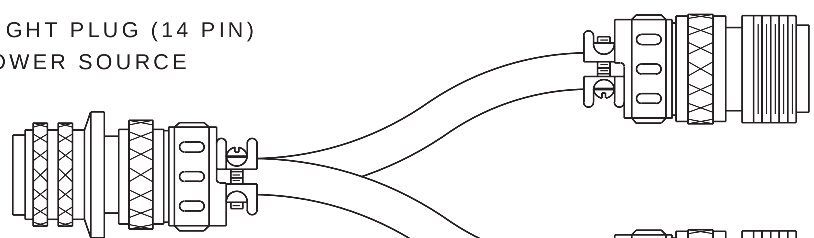
REMOTE CONTROL ADAPTERS

⚠ WARNING: ELECTRIC SHOCK CAN KILL

TURN THE POWER SWITCH OF THE WELDING POWER SOURCE "OFF" BEFORE INSTALLING PLUGS ON CABLES OR WHEN CONNECTING OR DISCONNECTING PLUGS TO WELDING POWER SOURCE.

K864

STRAIGHT PLUG (14 PIN)
TO POWER SOURCE



CABLE RECEPTACLE (6 SOCKET)

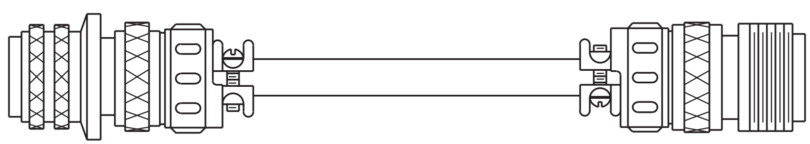
TO: 1) K857 REMOTE CONTROL
2) K963 HAND AMPTROL
3) K870 FOOT AMPTROL

CABLE RECEPTACLE (14 SOCKET)

TO: 1) LN-7 WIRE FEEDERS

K876

STRAIGHT PLUG (14 PIN)
TO POWER SOURCE



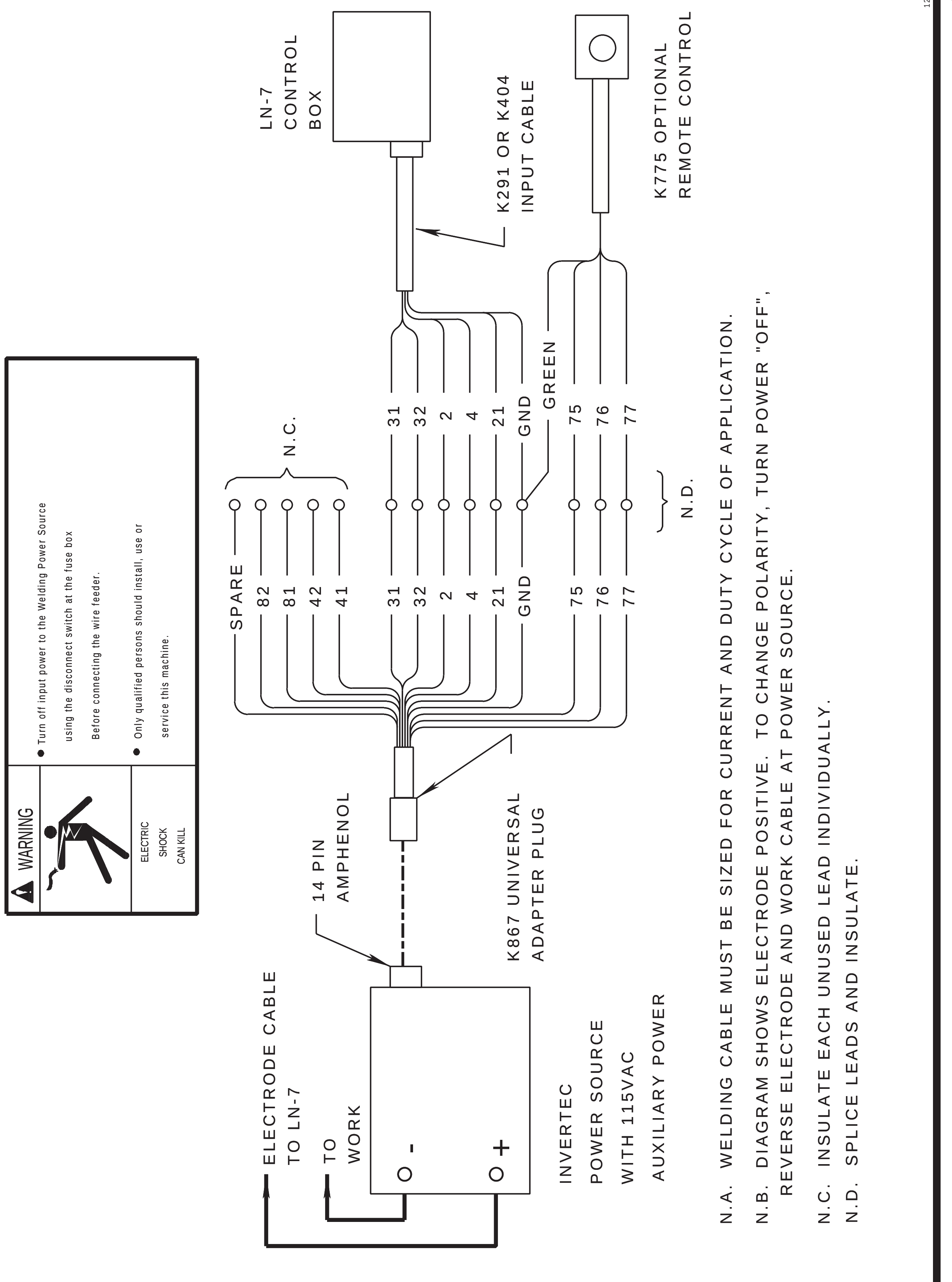
CABLE RECEPTACLE (6 SOCKET)

TO: 1) LN-25 WIRE FEEDERS

4-19-96D

S19309

K867 PLUG TO LN-7 - CONNECTION DIAGRAM



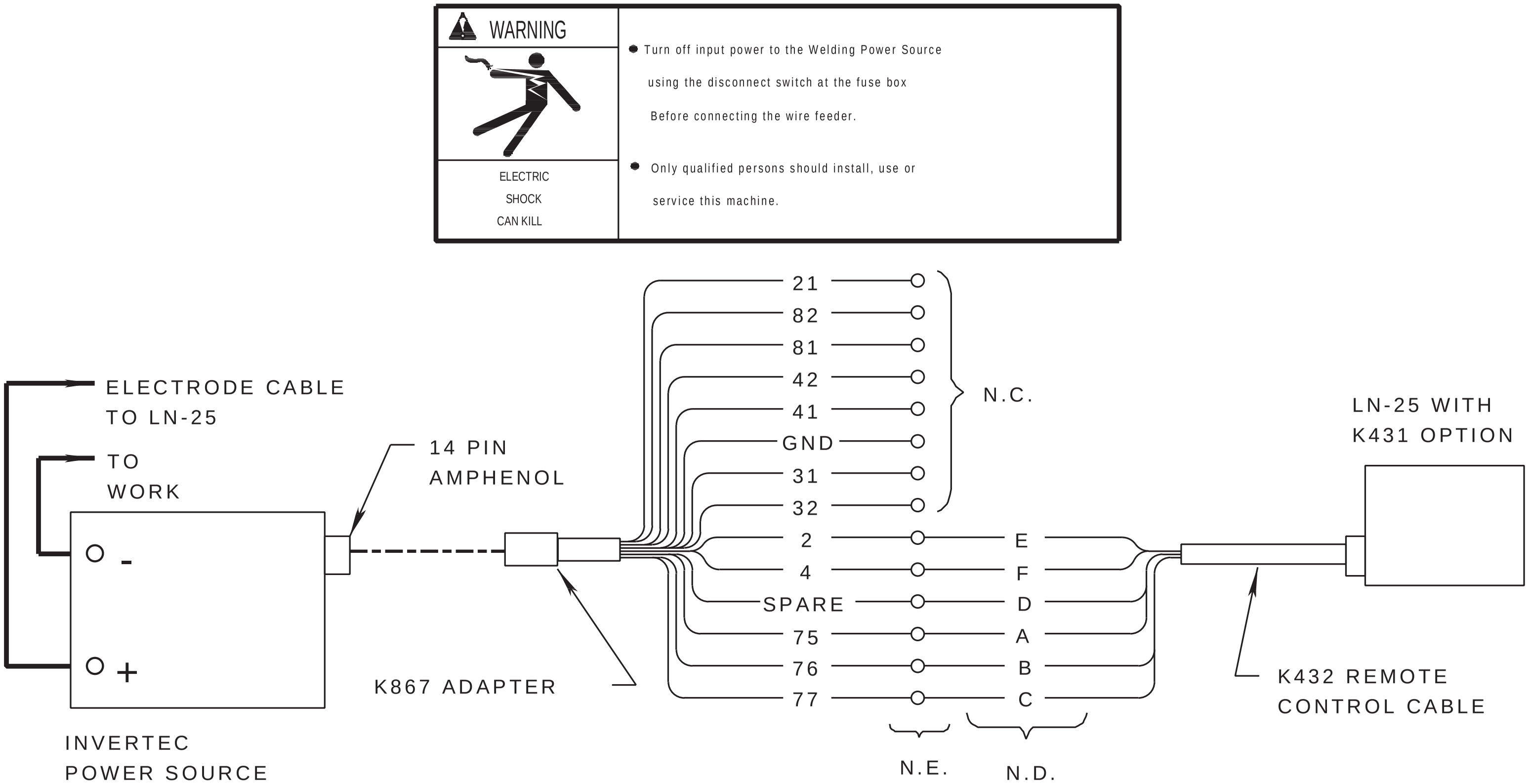
N.A. WELDING CABLE MUST BE SIZED FOR CURRENT AND DUTY CYCLE OF APPLICATION.

N.B. DIAGRAM SHOWS ELECTRODE POSITIVE. TO CHANGE POLARITY, TURN POWER "OFF", REVERSE ELECTRODE AND WORK CABLE AT POWER SOURCE.

N.C. INSULATE EACH UNUSED LEAD INDIVIDUALLY.

N.D. SPLICE LEADS AND INSULATE.

K867 PLUG TO LN-25 - CONNECTION DIAGRAM



N.A. WELDING CABLE MUST BE SIZED FOR CURRENT AND DUTY CYCLE OF APPLICATION.

N.B. DIAGRAM SHOWS ELECTRODE POSITIVE. TO CHANGE POLARITY, TURN POWER "OFF", REVERSE ELECTRODE AND WORK CABLE AT POWER SOURCE.

N.C. INSULATE EACH UNUSED LEAD INDIVIDUALLY.

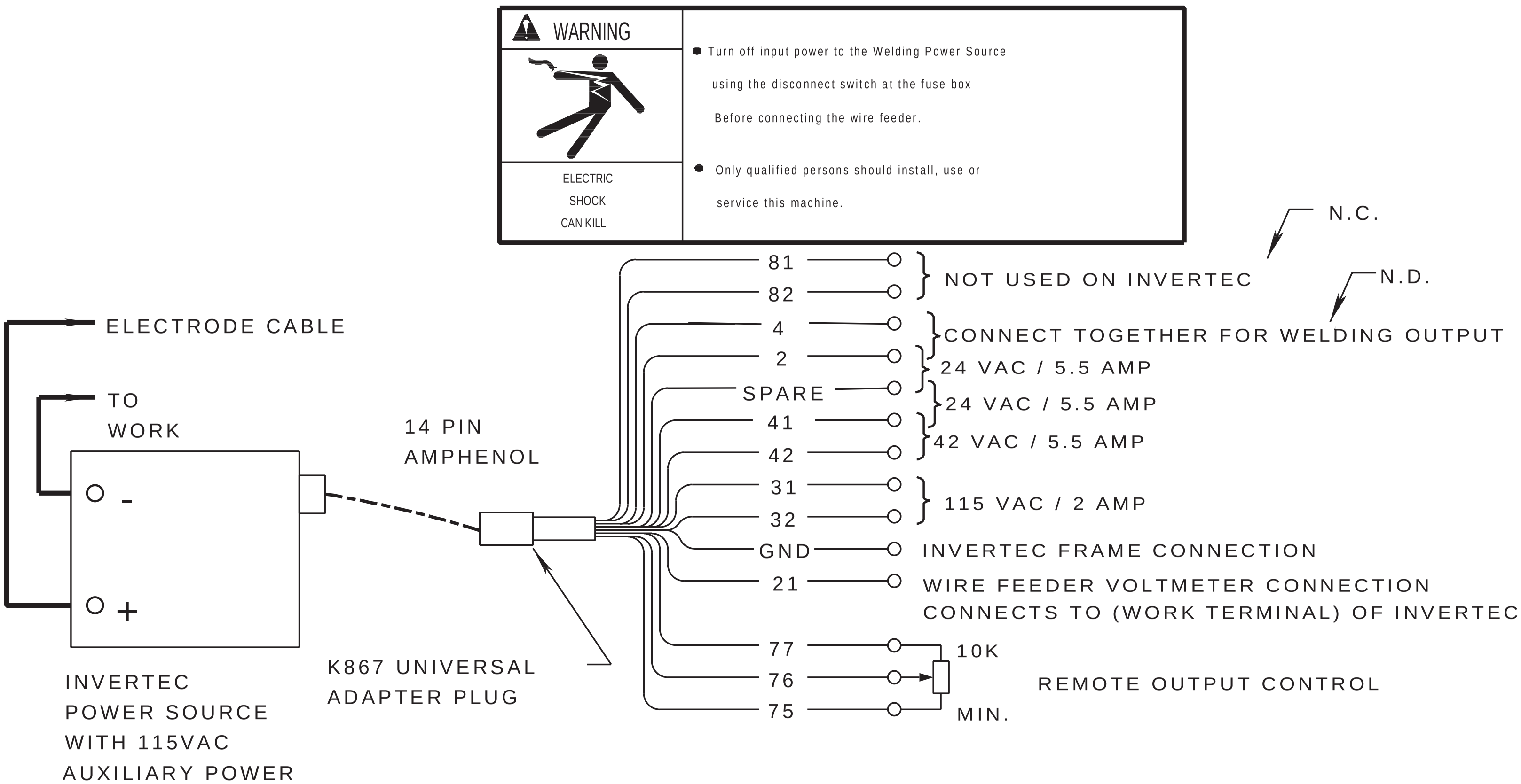
N.D. REMOVE 6 PIN PLUG FROM K432 CABLE IN ORDER TO CONNECT K867 PLUG. LABEL EACH LEAD (A THRU F) AS THEY ARE REMOVED FROM 6 PIN PLUG.

N.E. SPLICE LEADS AND INSULATE.

1-25-91

S19405

K867 UNIVERSAL ADAPTER / INVERTEC - CONNECTION DIAGRAM

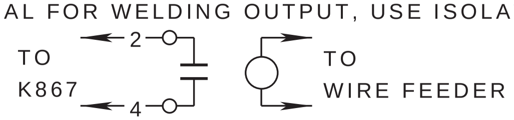


N.A. WELDING CABLE MUST BE SIZED FOR CURRENT AND DUTY CYCLE OF APPLICATION.

N.B. DIAGRAM SHOWS ELECTRODE POSITIVE. TO CHANGE POLARITY, TURN POWER "OFF", REVERSE ELECTRODE AND WORK CABLE AT POWER SOURCE.

N.C. INSULATE EACH UNUSED LEAD INDIVIDUALLY.

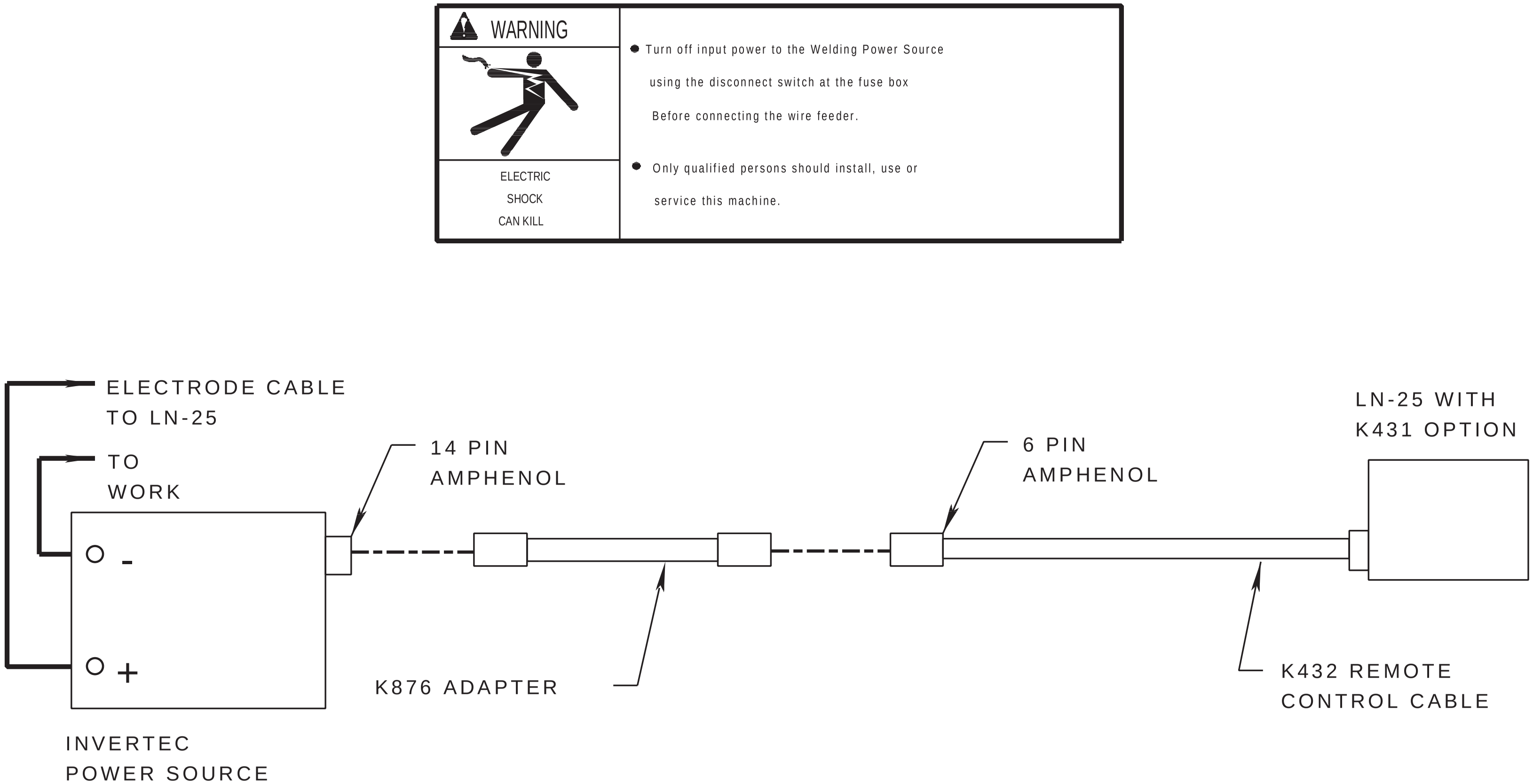
N.D. FOR WIRE FEEDERS THAT RETURN A SIGNAL FOR WELDING OUTPUT, USE ISOLATION RELAY TO CLOSE LEADS 2 & 4.



3-1-00

S24985

K876 ADAPTER TO LN-25 - CONNECTION DIAGRAM



N.A. WELDING CABLE MUST BE SIZED FOR CURRENT AND DUTY CYCLE OF APPLICATION.

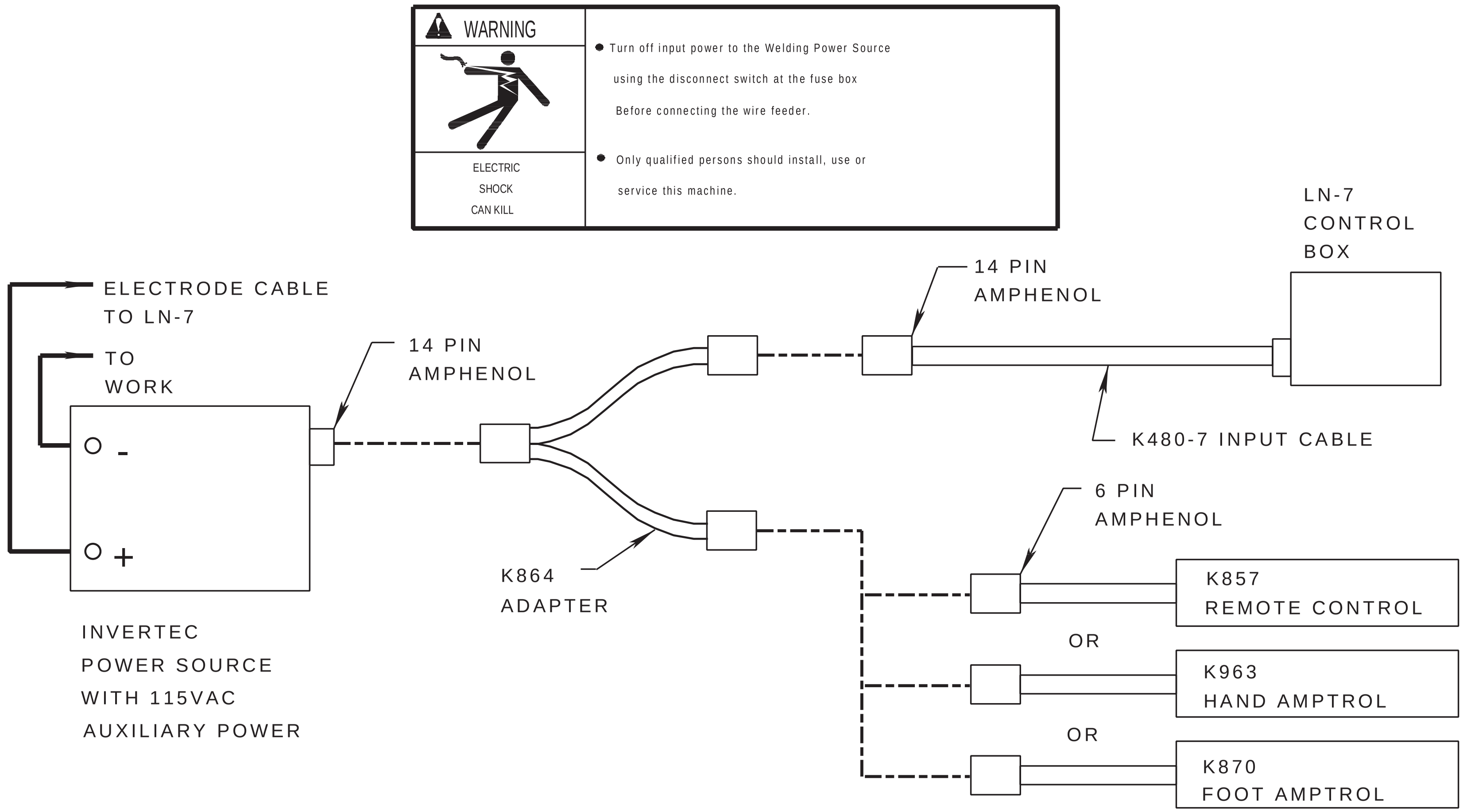
N.B. DIAGRAM SHOWS ELECTRODE POSITIVE. TO CHANGE POLARITY, TURN POWER "OFF", REVERSE ELECTRODE AND WORK CABLE AT POWER SOURCE.

N.C. FOR INVERTECS WITH 6 PIN AMPHENOL, K432 CABLE CAN BE CONNECTED DIRECTLY.

1-25-91

S19899

K864 ADAPTER TO LN-7 & REMOTE CONTROL - CONNECTION DIAGRAM



N.A. WELDING CABLE MUST BE SIZED FOR CURRENT AND DUTY CYCLE OF APPLICATION.

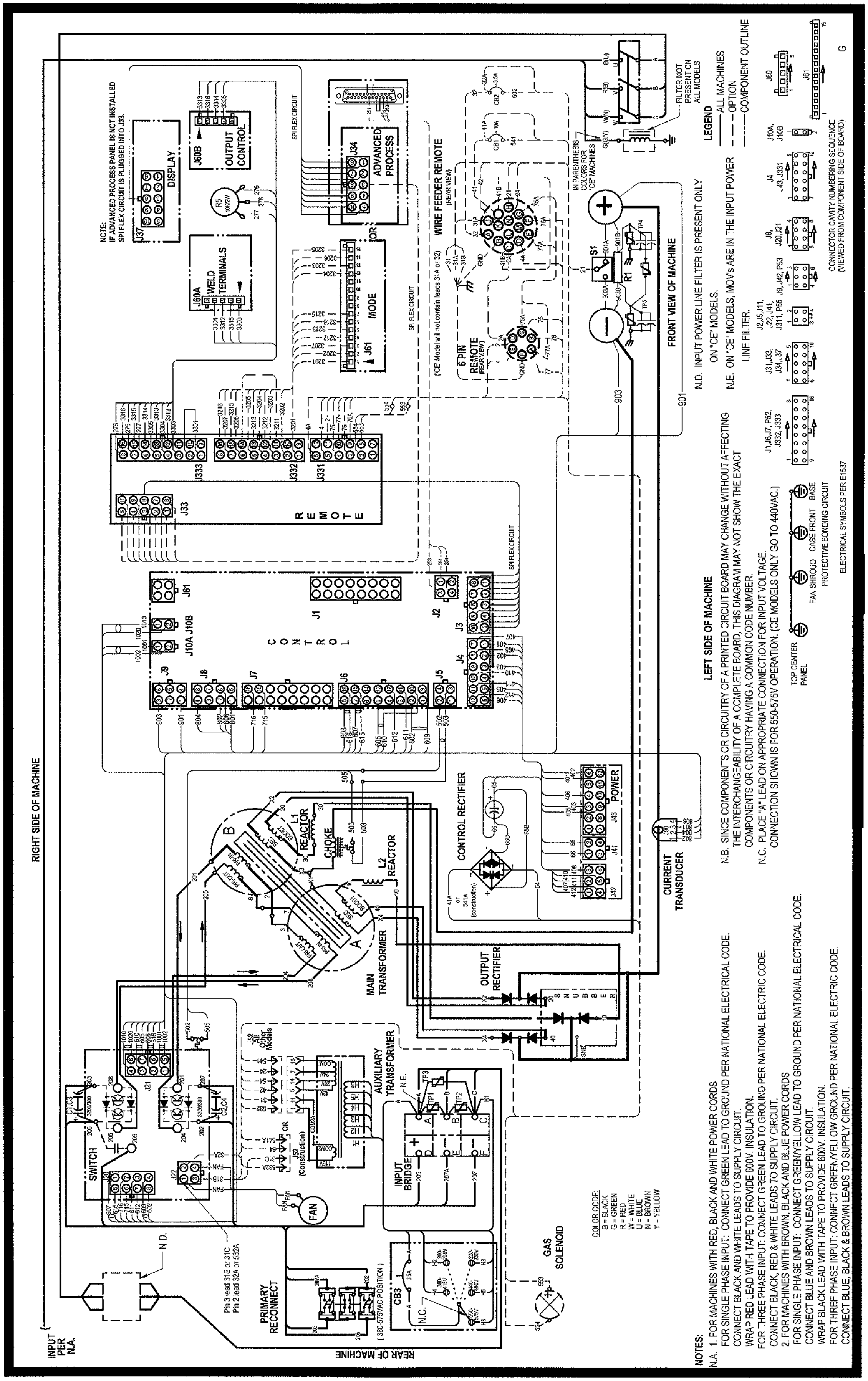
N.B. DIAGRAM SHOWS ELECTRODE POSITIVE. TO CHANGE POLARITY, TURN POWER "OFF", REVERSE ELECTRODE AND WORK CABLE AT POWER SOURCE.

N.C. K480-7 INPUT CABLE CAN BE CONNECTED DIRECTLY IF REMOTE CONTROL IS NOT REQUIRED.

N.D. K864 ADAPTER CANNOT BE USED WITH AN LN-25.

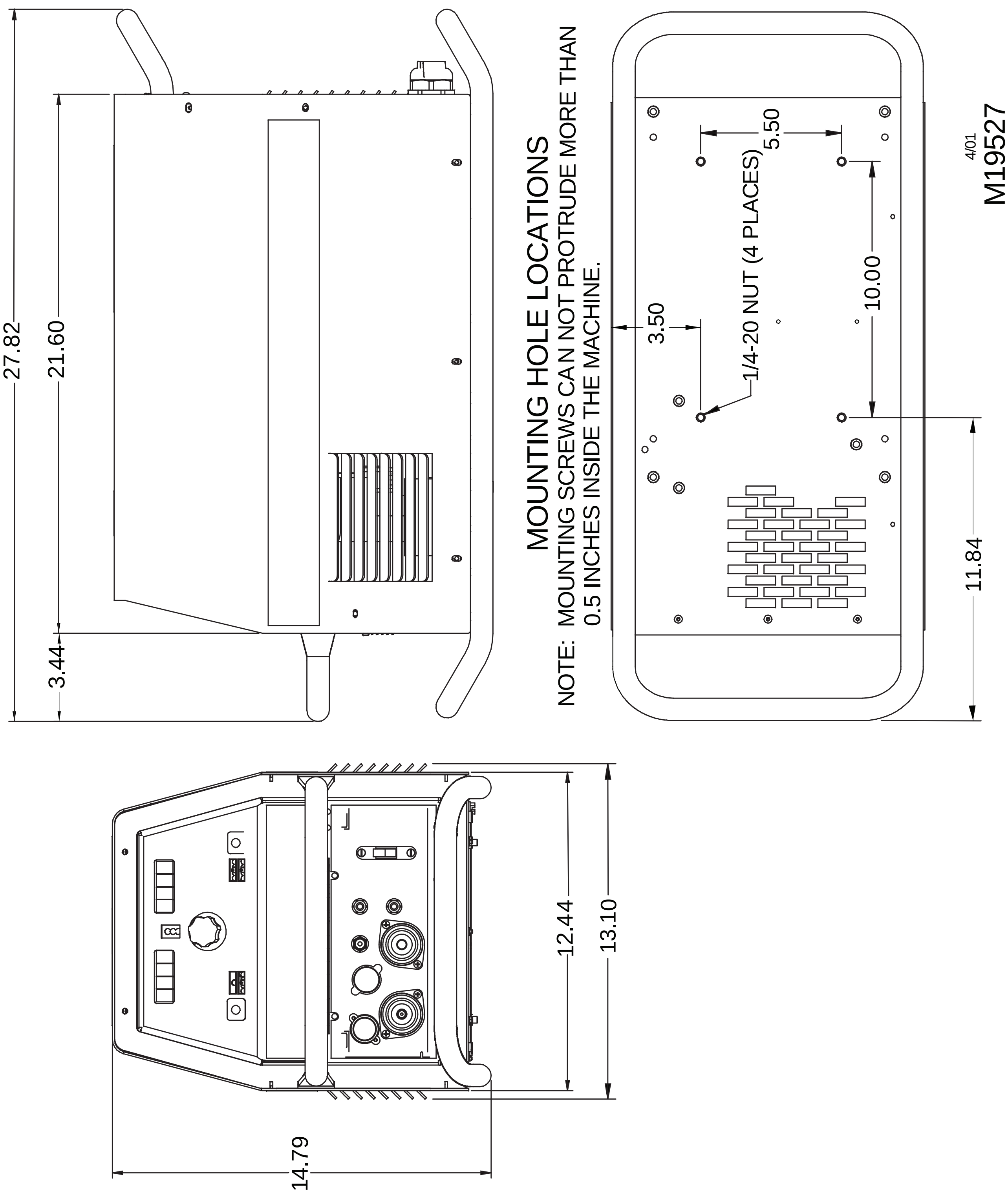
4-19-96D

S19901

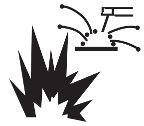


NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number.

DIMENSION PRINT



NOTES

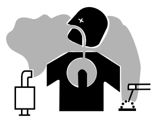
			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l’écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。	● 燃えやすいものの側での溶接作業は絶対にしてはなりません。	● 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	● 皮肤或濕衣物切勿接觸帶電部件及銲條。 ● 使你自己與地面和工件絕緣。	● 把一切易燃物品移離工作場所。	● 佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재와 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER’S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER’S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

			
● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	**WARNING**
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os paineis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。	● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切って下さい。	● パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese **注意事項**
● 頭部遠離煙霧。 ● 在呼吸區使用通風或排風器除煙。	● 維修前切斷電源。	● 儀表板打開或沒有安全罩時不準作業。	Chinese **警 告**
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic **تحذير**

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的説明以及應該使用的銲捍材料，並請遵守貴方的有關勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.